Design Speed of Highway (km/h)	Ratio of Length on Grade to Length on Level For Design Speed of Ramp Curve (km/h)					
	40	50	60	70	80	All Speeds
	3% ≤ Upgrade < 4%					3% ≤ Downgrade < 4%
60	1.30	1.40	1.40	--	--	0.70
70	1.30	1.40	1.40	1.50	--	0.65
80	1.40	1.50	1.50	1.50	1.60	0.65
90	1.40	1.50	1.50	1.50	1.60	0.60
100	1.50	1.60	1.70	1.70	1.80	0.60
110	1.50	1.60	1.70	1.70	1.80	0.60
	4% ≤ Upgrade ≤ 6%					4% ≤ Downgrade ≤ 6%
60	1.50	1.50	--	--	--	0.60
70	1.50	1.60	1.70	--	--	0.60
80	1.50	1.70	1.90	1.80	--	0.55
90	1.60	1.80	2.00	2.10	2.20	0.55
100	1.70	1.90	2.20	2.40	2.75	0.50
110	2.00	2.20	2.60	2.80	3.00	0.50

Notes: 1. No adjustment is needed on grades of less than 3%.

2. The "grade" in the table is the average grade measured over the distance for which the acceleration length applies.

Example

Given: Highway Design Speed - 110 km/h
Entrance Ramp Curve Design Speed - 70 km/h
Average Grade - 4.5% upgrade

Problem: Determine length of acceleration lane.

Solution: Figure 48-4D yields an acceleration length 210 m on the level. According to Figure 48-4E, this should be increased by 2.80.

Therefore: L = 2.80 x 280 m
L = 784 m

The additional 574 m (784 m – 210 m) should be added to the ramp prior to the entrance taper. See Figure 48-4C.

GRADE ADJUSTMENTS FOR ACCELERATION
(Passenger Cars)

Figure 48-4E